

In The Matter Of)
Revision of Part 15 of the Commission's) ET Docket No. 98-153
Rules Regarding Ultra-Wideband)
Transmission Systems)
)

QUALCOMM'S REPLY IN SUPPORT OF ITS
PETITION FOR RECONSIDERATION

I. Summary

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In the specific demonstration, the data showed that PCS handsets can and do operate near -105 dBm.

XtremeSpectrum and Time Domain have opposed QUALCOMM's petition by claiming that QUALCOMM's results are not realistic. There is simply no merit to these contentions, as shown below. QUALCOMM's data was the result of real world testing using a commercial PCS handset and a commercial PCS network, and in the real world, PCS phones do operate at the signal levels found in QUALCOMM's tests. Thus, the Commission should reconsider the First R&O and provide additional protection to the PCS band because PCS phones operate at much lower received signal levels than -96 dBm, the level for which the First R&O provided protection.

II. Reply to XtremeSpectrum

In its filing, XtremeSpectrum claimed that QUALCOMM's PCS call data provided in an earlier filing did not represent real-world multipath fading environment with RFI.¹ They try to justify this claim by stating that the received signal power did not show characteristic Rayleigh fades. This conclusion by XtremeSpectrum is inaccurate and obviously, they misinterpreted the data. The data was taken in a weak coverage area and represented an approximately five minute call. The same plot with the cumulative FER curve added, is shown in

¹ XtremeSpectrum, Opposition to Petitions for Reconsideration, July 31, 2002, Technical Statement, pg i-iii

Figure 1 on page 5 of this reply. Apparently, from this plot, due to the selected scales, the signal variation is not clearly visible. Figure 2 on page 5 herein shows a zoomed in version of the same plot. We can clearly see the received signal fluctuating from around -94 dBm to -108 dBm with a mean of about -103 dBm.

The other issue raised by XtremeSpectrum is its claim that the spikes in the frame error rate ("FER") exceeding 2% at lower signal levels are "unacceptable." They go on to state that this was the reason why the FCC concluded that the -105 dBm level was unreasonable. Apparently, XtremeSpectrum does not understand how FER is used as a measure of quality of service ("QOS"). Indeed, the plots do indicate FER exceeding 2%, but this is an instantaneous FER in a small window of time. Depending on how the network and power control loops have been optimized, these spikes are normal. What is important is the cumulative FER over the entire call duration and that value has to be less than the acceptable QOS FER dictated by the network operator. The two figures on page 5 show that by the end of the call, the cumulative FER is approximately 1.28%, which is exactly what QUALCOMM's previous filing stated.²

Thus, we can conclude from QUALCOMM's test data that the PCS call is indeed sustainable with acceptable QOS at received signal levels lower than -100 dBm, contrary to both XtremeSpectrum's and the Commission's suggestions. For

² Qualcomm, Inc Petition for Reconsideration, June 17, 2002, pg 7

this reason, the Commission must reconsider the First R&O and provide additional protection to the PCS band.

The last issue raised by XtremeSpectrum is that the signal-to-noise ratio analysis of QUALCOMM is flawed for having used a level of -100 dBm. As explained in the previous paragraphs, and looking at the plots, we can clearly see that the use of -100 dBm is acceptable, and that QUALCOMM's analysis is entirely justifiable from the measured real-world data. The data presented was taken in an indoor office environment and logged by a commercial PCS phone operating in the 1900 MHz frequency band and using a commercial network. XtremeSpectrum's suggestion that this data "includes no allowance for real world conditions" is factually inaccurate.

Accordingly, the Commission should grant QUALCOMM's petition, deny XtremeSpectrum's opposition thereto, and provide additional protection for the PCS band from harmful interference from UWB devices.

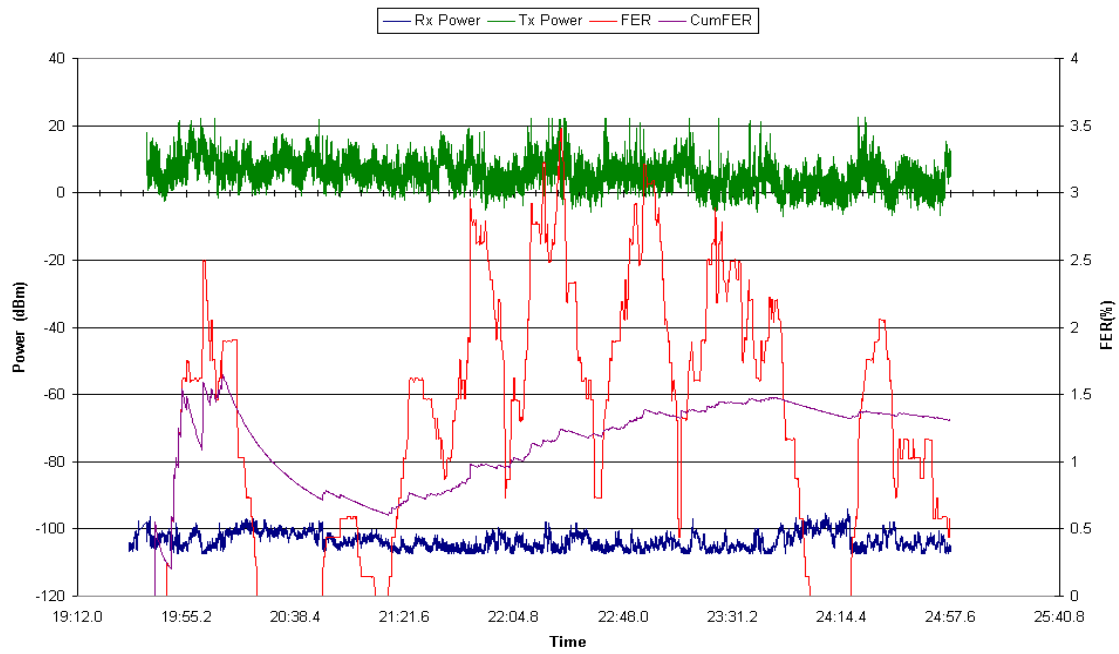


Figure 1: Handset RX power, TX power, Instantaneous FER & Cumulative FER at weak coverage location

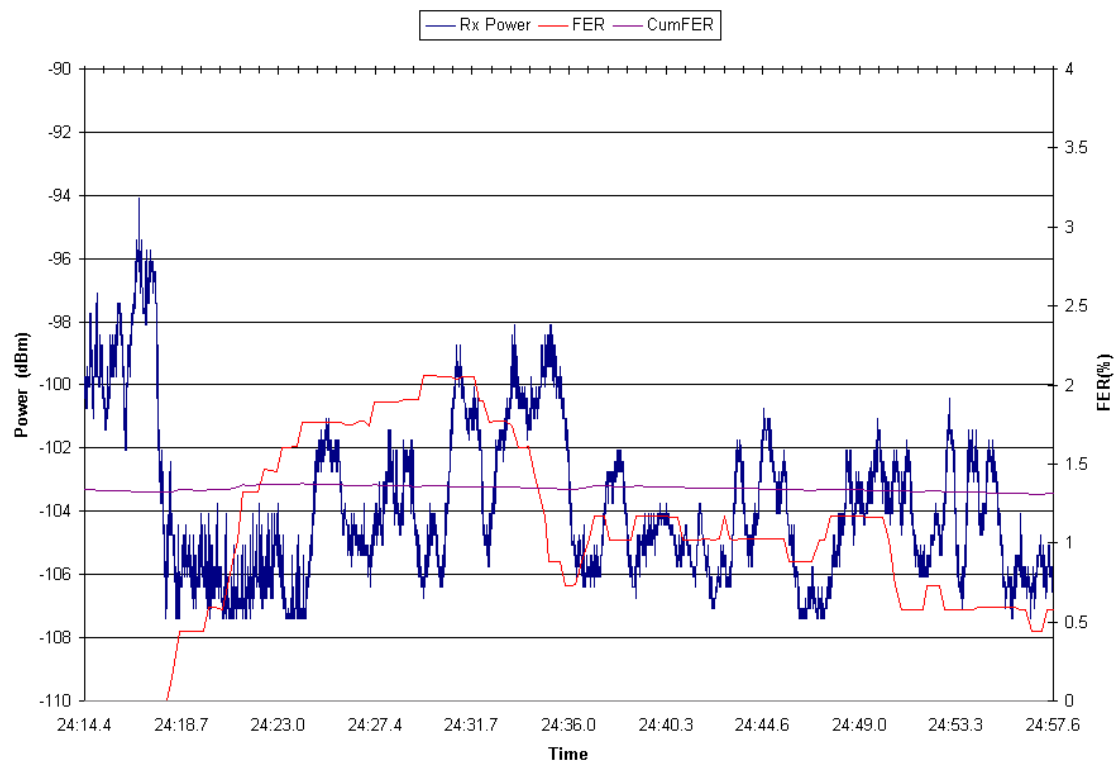


Figure 2: Handset RX power, TX power, Instantaneous FER & Cumulative FER at weak coverage location (Zoomed)

III. Reply to Time Domain

In its opposition, Time Domain only makes one specific statement with respect to QUALCOMM's test data, and it has no merit. In its Executive Summary, Time Domain states that Sprint and QUALCOMM claim rake receiving allows them to operate at or below -105 dBm because it eliminates Rayleigh fading.³ QUALCOMM did not make any such claim. The sensitivity of the CDMA PCS phone allows it to operate at or below -105 dBm depending on the noise figure of the receiver. Despite multipath and Rayleigh fading, the fact is that CDMA PCS phones can and do operate at the levels found in QUALCOMM's test.

QUALCOMM's test was not a simulation. Rather, the test was conducted with a real off -the-shelf phone over a real operating PCS network in real world conditions. QUALCOMM's test proves that the First R&O provided insufficient protection to PCS because of the erroneous finding that PCS phones operate no lower than -96 dBm. There is now no basis for that finding, and therefore the Commission must reconsider and revise the First R&O.

On page 8 of its opposition, Time Domain suggests that in an indoor mobile environment, PCS phones have particular difficulty operating due to

³ Time Domain Corporation Opposition to Petition for Reconsideration, July 31, 2002, pg. ii.

fading.⁴ QUALCOMM's principal concern in this proceeding is not and never has been interference from UWB devices to PCS phones in a mobile indoor scenario. Rather, our concern relates more to stationary scenarios, such as someone inside an office with poor coverage trying use a wireless phone to call 911, but who is surrounded with UWB devices in close proximity used for a wireless LAN or some other short range application. Another example would be someone attending a meeting in a conference room trying to use a wireless phone to place a call while other attendees are exchanging business cards or computer files with UWB devices. There is a virtually endless array of examples of this type wherein people will be trying to use wireless phones in a stationary condition in a location where coverage is weak. As QUALCOMM's test data proves, today, Americans use their PCS phones in these types of conditions all the time, and they are able to place and receive calls at signal levels of -100 dBm and below. The Commission has adopted rules for UWB operations that simply do not provide sufficient protection for this real world use of PCS phones against harmful interference from UWB devices.

IV. Conclusion

For the foregoing reasons, QUALCOMM respectfully requests that the Commission grant QUALCOMM's petition for reconsideration and provide the

⁴ Id. at pg. 8.

PCS band with the 34 dB of protection from harmful interference from UWB devices as was provided to the GPS band.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Dean R. Brenner, do hereby certify that a true and correct copy of the foregoing " Xtreme and TimeDomain Reply" was served by mail this 14th day of August 2002 to:

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